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### Sex differences in central expression and anorectic effects of brain-derived neurotrophic factor

Haifei Shi

Miami University, USA

A key cause of obesity is increased food intake and decreased energy expenditure. The CNS receives information from the periphery relevant to an individual's energy balance through metabolic, neural, and endocrine signals. Brain-derived neurotrophic factor (BDNF) is a neurotrophin that plays essential roles in the regulation of energy balance in the CNS by promoting decreased food intake and increased energy expenditure. There is increasing evidence that regulation of energy balance and body weight is not the same for both genders. BDNF neurons are downstream mediators of the melanocortinergic system, and they directly receive input from the pro-opiomelanocortin (POMC) neurons that are activated by an adiposity signal leptin. Females have greater sensitivity to central leptin than males, suggested by a greater anorectic effect of central leptin administration in females, suggesting possible sex differences in the leptin-POMC downstream BDNF system. We described the phenotype of mice lacking leptin receptors selectively in POMC neurons and identified sex differences in energy balance regulation. Mice with disrupted leptin-POMC signaling exhibit gender-specific physiological mechanisms to reach similar level of obesity; male mice consume more calories while female mice burn fewer calories. The interesting finding is that both males and females with disturbed leptin-POMC signaling show increased adiposity but achieve this through distinct physiological mechanisms. We recently reported sex differences in central Bdnf expression and the anorectic effects of BDNF, which were modulated by circulating levels of estradiol. To conclude, central melanocortin system and its downstream BDNF system regulate sex differences in the regulation of energy homeostasis.

#### Biography

Haifei Shi received her MD from Beijing Medical University China in 1997, PhD from Georgia State University in 2004, and postdoctoral training at the University of Cincinnati. She has been a professor at Miami University Ohio since 2009. She has trained many graduate and undergraduate students. She has received several grants from NIH and AHA and several awards from NIDDK and the Endocrine Society. She teaches Human Physiology and Endocrinology courses at both graduate and undergraduate levels at Miami University. She has published 30 papers and book chapters on the neuroendocrine regulation of energy balance and body fat.

[shih@miamioh.edu](mailto:shih@miamioh.edu)